



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|-----------------------|-------------------------------|------------------------|
| 10/800,732 | 03/16/2004 | Konstantin Rodyushkin | P-6214-US | 1716 |
| 49444 | 7590 | 07/31/2007 | | |
| PEARL COHEN ZEDEK LATZER, LLP 1500 BROADWAY, 12TH FLOOR NEW YORK, NY 10036 | | | EXAMINER REDDING, THOMAS M | |
| | | | ART UNIT 2624 | PAPER NUMBER |
| | | | MAIL DATE 07/31/2007 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|-------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/800,732 | Applicant(s) RODYUSHKIN ET AL. | |
| | Examiner Thomas M. Redding | Art Unit 2624 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-32 is/are allowed.
- 6) ☒ Claim(s) 1-5, 18-22, 24 and 33-41 is/are rejected.
- 7) ☒ Claim(s) 6-17, 23 and 26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>3/16/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 3/16/2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

The reference that has not been considered is the URL for the Open Source Computer Vision Library, <http://www.intel.com/research/mrl/research/opencv/>. This reference is problematic as it is non-static and the information changes over time. In fact the address provided is no longer current. To be considered, a printed copy of the web-pages of interest would need to have been submitted in the IDS at the time of application.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2. Claims 36-41 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 36-41 define "An article comprising a storage medium ..." embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology

Art Unit: 2624

permits the function of the descriptive material to be realized" – Guidelines Annex IV).

The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A "signal" (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3 – 5, 36-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Yuille et al. (cited in applicants IDS).

Regarding claim 1, Yuille discloses estimating features of a mouth in a current image of a sequence of digital images of a human face ("We define a mouth-closed template and a mouth-open template ...", Yuille, page 104, column 1, line 5 and figure 5 on page 104) by deriving a deformable mouth model template ("We propose a new method to detect such features by using deformable templates", Yuille, page 99, column 1, line 17) in an iterative process ("The parameters of the template are then updated by steepest descent", Yuille, page 99, column 2, line 7, and figure 8 on page 107), said process including:

minimizing an energy function ("The minimum of the energy function corresponds to the best fit with the image", Yuille, page 99, column 2, line 6) receiving iteration-

Art Unit: 2624

dependent arguments to determine optimal transformation parameters of an iteration-dependent transformation ("The final values of these parameters can be used to describe the features", Yuille, page 99, column 1, line 21); and

transforming components of said deformable mouth model template by said iteration-dependent transformation having said optimal transformation parameters ("The final values of these parameters can be used to describe the features." Yuille, page 99, column 1, line 21). The parameters referenced by Yuille describe the modifications needed modify the template from its base state to a best fit with the image.

Regarding claim 3, Yuille teaches the elements of claim 1 above wherein estimating said features includes estimating positions of lips of said mouth ("The parabolas for the top of the upper lip (P_1 and P_2), bottom of the upper lip (P_3), top of the lower lip (P_4), and bottom of the lower lip (P_5) are given by equations (21), (22), (23), (24), and (25), respectively", Yuille, page 105, column 2, line 3). The tops and bottoms mentioned describe the position of the lips.

Regarding claim 4, Yuille teaches the elements of claim 1 above wherein estimating said features includes estimating shapes of lips of said mouth ("The parabolas for the top of the upper lip (P_1 and P_2), bottom of the upper lip (P_3), top of the lower lip (P_4), and bottom of the lower lip (P_5) are given by equations (21), (22), (23), (24), and (25), respectively", Yuille, page 105, column 2, line 3). The parabolas

Art Unit: 2624

mentioned describe the shape of the lips, the parabola parameters being developed in the deformation of the template.

Regarding claim 5, Yuille teaches the elements of claim 1 above wherein estimating said features includes estimating positions of teeth in said mouth ("The mouth-open template can be obtained by having two valley parabolas instead of one. The region between them corresponds to the teeth", Yuille, page 105, column 2, line 1)

Regarding claim 36, as described above for claim 1, Yuille teaches the elements of the method as described in claim 1. Yuille describes the results of his tests as run on a computer ("This theory was tested on real images using a SUN4 computer" Yuille, page 102, column 1). The instructions and data would of necessity have been on a computer readable storage medium.

Regarding claim 37, Yuille teaches the elements of the method in common with claim 1, 3 and 4. Testing his algorithm would require a computer readable storage medium as discussed above for claim 36.

Regarding claim 38, Yuille teaches the elements of the method in common with claim 1 and 5. Testing his algorithm would require a computer readable storage medium as discussed above for claim 36.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille et al. (cited in applicants IDS)

Regarding claim 2, Yuille teaches said process further includes:

initializing said deformable model template according to a base image of said sequence ("for succeeding frames, we use as the initial position the best fit of the preceding frame", Yuille, page 109, column 1, line 2).

Yuille example is for eye tracking rather than mouth tracking in this description, but Yuille does state "It is straightforward to adapt the deformable templates for tracking", page 106, column 2, first sentence under Tracking heading).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the tracking method of Yuille to the mouth in facial images in order to track mouths automatically ("Here we describe a straightforward implementation that tracks eyes automatically", Yuille, page 106, column 2, 2nd sentence under Tracking heading).

Art Unit: 2624

7. Claims 18-20, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille et al. (cited in applicants IDS) in combination with Yan et al. (US 6,975,750).

Regarding claim 18, Yuille teaches the elements that are in common with claim 1 as described above. Yuille does not teach [an] energy function [that] includes a bound energy term to ensure that said deformable mouth model template represents a physiologically possible state of said mouth.

Yan working in the same field of endeavor of modeling facial features, does teach [an] energy function [that] includes a bound energy term to ensure that said deformable mouth model template represents a physiologically possible state of said mouth ("The creation of the cost function is an important part in the deformable template procedure. To this end, different energy items are defined to express the fitting degree between the template and the image properties such as the peaks, valleys and edges.", Yan, column 7, line 28, and "an internal constraint function and a punishment function are defined", Yan, column 7, line 31).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the internal constraint and punishment functions of Yan to the feature modeling system of Yuille in order "to avoid the template deforming to an illegal or unreasonable shape" (Yan, column 7, line 30).

Regarding claim 19, the combination of Yuille and Yan teaches [t]he method of claim 18, wherein said deformable mouth model template includes contours representing upper and lower boundaries of an upper lip of said mouth (figure 6, Yuille,

Art Unit: 2624

page 105, column 2), and contours representing upper and lower boundaries of a lower lip of said mouth (figure 6, Yuille, page 105, column 2),

wherein said energy function is a lips energy objective function, and

wherein said bound energy term penalizes lip shapes and lip positions that vary too greatly from lip shapes and lip positions of said mouth in a base image of said sequence ("an internal constraint function and a punishment function are defined", Yan, column 7, line 31 ", Yan, column 7 and 8).

Regarding claim 20, the combination of Yuille and Yan teaches The method of claim 18, wherein said deformable mouth model template includes inner and outer lip contours representing upper and lower lips of said mouth (see above) and teeth contours representing upper and lower teeth of said mouth ("the teeth potential, which attempts to maximize the average intensity and strength of edges in the teeth region R1 between the upper and lower lips", Yuille, page 106, column 1 and "The first four internal potentials are the same as for the mouth-open template", Yuille, page 106, column 1, Yuille is stating that the teeth are modeled much the same as the lips with corresponding upper and lower edges),

wherein said energy function is a teeth energy objective function, and

wherein said bound energy term penalizes any occurrence of said teeth contours overlapping and any occurrence of said teeth contours not located between said inner lip contours ("an internal constraint function and a punishment function are defined",

Art Unit: 2624

Yan, column 7, line 31, it would be obvious for the reasons given above to apply the constraint and punishment to the teeth equations just as for the lip equations.

Regarding claim 24, the combination of Yuille and Yan teach the elements that are common with claim 1. The combination further teaches wherein said energy function includes a teeth gap energy term to describe vertical gaps between the upper teeth and lower teeth. (Yuille describes a "valley" term E_v to describe the gap between the lips. "The mouth-open template can be obtained by having two valley parabolas instead of one", Yuille, page 105, column 2, line 1, It would be reasonable to have such a valley term to describe any separation between the teeth).

Regarding claim 25, the combination of Yuille and Yan teaches an energy function [that] is a lips energy objective function ("the edge potential, calculated along the upper lip parabolae $y_1(x)$ and $y_2(x)$ and the lower lip parabola $y_3(x)$ ", Yuille, page 105, column 1, line 2, the function clearly has lip energy).

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille et al. (cited in applicants IDS) in combination with Malciu et al. (cited in applicants IDS).

Regarding claim 21 Yuille teaches all the elements that are common with claim 1. Yuille also teaches an energy function [that] includes an energy term to attract contours of said deformable mouth model template to respective parabolas. Yuille does not teach using an elastic spline term..

Malciu working in the same field of endeavor of facial feature tracking, does teach an energy function [that] includes an elastic spline energy term to attract contours of said deformable mouth model template to respective parabolas ("spline-based representations have been successfully used for facial component modeling" Malciu, page 54, line 6, a mouth is a facial component)

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the spline modeling technique of Malciu to the facial feature modeling system of Yuille in order to select a mouth template function that is accurate and compact ("The selection of an adequate family of shape functions is dictated by accuracy and compactness requirements. The most frequent choice consists of second order interpolating polynomials, especially parabolic arcs", Malciu, page 54, line 1)

9. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille (cited in applicants IDS) and Malciu (cited in applicants IDS) in combination with Schoepflin (US 6,574,353 B1).

Regarding claim 22, Malciu teaches the use of splines for modeling the mouth.

The combination of Yuille and Malciu does not teach an elastic spline energy term [which] is zero for coarse transformations and for fine transformations.

Schoepflin, working in the same field of endeavor of object tracking via deformable templates, does teach an elastic spline energy term [which] is zero for coarse transformations ("In a preferred embodiment, three levels of deformation and tracking are implemented. At a highest level, an initial template used for a current image

Art Unit: 2624

frame is translated and rotated to coarsely locate the object boundary among the energy representation of the image frame", Schoepflin, column 2, line 11) and for fine transformations ("at a middle level, an affine transformation is implemented to deform the template", Schoepflin, column 2, line 27).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the deformable template hierarchy technique of Schoepflin to the facial feature modeling system of the combination of Yuille and Malciu in order to accurately track a complex boundary ("an accurate boundary of an object is tracked for objects which deform or include rapidly moving sub-portions." Schoepflin, column 13, line 41).

10. Claims 33 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille et al. (cited in applicants IDS) in combination with Moulton (US 6,778,252 B2)

Regarding claim 33 Yuille teaches all the elements that are common with claim 1. Yuille does not teach a deformable mouth model template including a first contour to represent a lower boundary of upper teeth of said mouth and a second contour to represent an upper boundary of lower teeth of said mouth.

Moulton, working in the same field of endeavor of modeling facial motion, does teach a deformable mouth model template including a first contour to represent a lower boundary of upper teeth of said mouth ("a point for the bottom edge of the upper teeth", Moulton, column 8, line 12) and a second contour to represent an upper boundary of

Art Unit: 2624

lower teeth ("a point for the upper edge of the lower teeth", Moulton, column 8, line 13) of said mouth. Moulton indicates that these points are associated with edges. These edges correspond to contours ("All these points are connected to surfaces that can be recognized as edges by the computer vision system" Moulton, column 8, line 14).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the teeth contour tracking of Moulton to the facial feature modeling system of Yuille in order to generate a more complete model of a subject mouth. In the course of normal conversation the teeth are often visible and it would be desirable to include in the model.

Regarding claim 39, the Yuille Moulton combination teaches the elements of the method in common with claim 33. . Yuille describes the results of his tests as run on a computer ("This theory was tested on real images using a SUN4 computer" Yuille, page 102, column 1). The instructions and data would of necessity have been on a computer readable storage medium.

11. Claims 34, 35, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuille et al. (cited in applicants IDS) and Moulton (US 6,778,252 B2) in combination with Malciu et al. (cited in applicants IDS).

Yuille and Moulton teach the elements of the method of claim 33 as described above. Yuille and Moulton do not teach a deformable mouth model template [which] further includes a first center control point located substantially on the center of said first contour, a second center control point located substantially on the center of said second contour, a right control point common to said first contour and said second contour to represent a right corner of said mouth, and a left control point common to said first contour and said second contour to represent a left corner of said mouth.

Malciu, does teach a deformable mouth model template [which] further includes a first center control point located substantially on the center of said first contour, a second center control point located substantially on the center of said second contour, a right control point common to said first contour and said second contour to represent a right corner of said mouth, and a left control point common to said first contour and said second contour to represent a left corner of said mouth (Malciu, figure 1 and 2).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the control points of Malciu with the facial feature modeling system of the combination of Yuille and Moulton in order to establish "templates to model in a compact fashion highly variable objects with multiple parts and complex topologies" (Malciu, page 52, line 23). It also would be desirable to have models consistent with the MPEG-4 international standard (Malcui, page 53, first paragraph).

Regarding claim 35, the combination of Yuille, Mouton and Malcui teaches a deformable mouth model template [that] further includes a first left-center control point located on said first contour between said left control point and said first center control

Art Unit: 2624

point, a second left-center control point located on said second contour between said left control point and said second center control point, a first right-center control point located on said first contour between said right control point and said first center control point, and a second left-center control point located on said second contour between said right control point and said second center control point (Malciu, figures 1 and 2).

Regarding claim 40, the combination of Yuille, Mouton and Malciu teaches the elements of the method in common with claim 34. Testing his algorithm would require a computer readable storage medium as discussed above for claim 36.

Regarding claim 41, the combination of Yuille, Mouton and Malciu teaches the elements of the method in common with claim 35. Testing his algorithm would require a computer readable storage medium as discussed above for claim 36.

Allowable Subject Matter

12. Claims 6-17, 23, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter in the claim listed above:

Regarding claim 6 as well as claims 7-10 which depend therefrom, the prior art of record does not teach double-blurring particular digital images of said sequence to

Art Unit: 2624

produce double-blurred images; or double-filtering maps derived from said current image to produce double-filtered maps, wherein for a particular iteration, minimizing said energy function includes minimizing said energy function receiving said double-blurred images and said double-filtered maps.

Regarding claim 11 as well as claims 12-16 which depend therefrom, the prior art of record does not teach blurring particular digital images of said sequence to produce blurred images; and filtering maps derived from said current image to produce filtered maps, wherein for a particular iteration, minimizing said energy function includes minimizing said energy function receiving said blurred images and said filtered maps, and said iteration-dependent transformation is a fine transformation.

Regarding claim 23, the prior art of record does not teach a lips energy objective function and said elastic spline energy term is related to a square of a width of said mouth in a base image of said sequence.

Regarding claim 26, the prior art of record does not teach [a] teeth gap energy term [that] also describes vertical edges of teeth and an absence of teeth in a cavity of said mouth.

14. Claims 27-32 are allowed.

The following is an examiner's statement of reasons for allowance for the claims listed above:

Regarding claim 27 as well as claims 28 and 29, which depend therefrom, the prior art of record does teach the use of texture energy (Malciu, page 55, 3rd paragraph), it does not teach the use of texture differences in lips and corners of said mouth compared to a different image of said sequence.

Regarding claim 30, as well as claims 31 and 32 that depend therefrom, the prior art of record does not teach an energy function [that] includes a corner energy term that attracts lip corners to an area having a particular vertical intensity gradient structure.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kervrann et al. (A Hierarchical Markov Modeling Approach for the Segmentation of Tracking of Deformable Shapes) does teach using gradients in the tracking of deformable shapes (page 174, column 1, 3rd paragraph).

Mirhosseini et al. (A hierarchical and adaptive Deformable Model for Mouth Boundary Detection) teaches mouth corner detection, but does not teach texture differences or vertical intensity gradients.

Freeman (US 5,454,043) teaches blurring a histogram signature to ease pattern matching, but he does not describe additional filtering.

Berger (US 2005/0057569 A1) teaches using a base model as a starting point for a deformable model.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TMR/



Brian P. Werner
Supervisory Patent Examiner
Art Unit 2624